

# NASA Laser Communications with Adaptive Optics and Linear Mode Photon Counting, Phase I

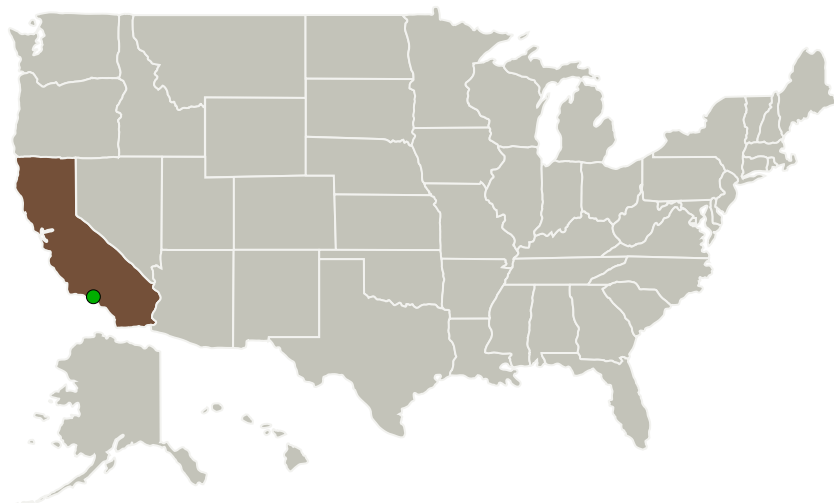
Completed Technology Project (2015 - 2015)



## Project Introduction

In this effort, the Optical Sciences Company (tOSC) and Raytheon Vision Systems (RVS) will team to provide NASA with a long range laser communications system for spacecraft in the solar system. The ultimate product will be two components: (1) a spacecraft-based transceiver that uses small Size, Weight, and Power (SWAP) components to generate signals that can be detected at Earth; and (2) a ground-based transceiver system that uses Laser Guide Star (LGS) Adaptive Optics (AO) plus Linear Mode Photon Counting (LMPC) Avalanche Photo-Diode (APD) detectors to sense the incoming laser communications signals. tOSC has multiple contracts in laser communications technology, and has developed numerous AO systems for the USAF, while Raytheon is the world's largest producer for advanced sensors, including photon counting technology.

## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
G. A. Tyler Associates, Inc dba the Optical Sciences Company	Lead Organization	Industry	Anaheim, California
 Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	1
Project Transitions	2
Images	2
Technology Maturity (TRL)	2
Technology Areas	2
Target Destinations	3

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

G. A. Tyler Associates, Inc dba the Optical Sciences Company

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

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## Primary U.S. Work Locations

California

## Project Transitions

**June 2015:** Project Start

**December 2015:** Closed out

**Closeout Summary:** NASA Laser Communications with Adaptive Optics and Linear Mode Photon Counting, Phase I Project Image

### Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/139276>)

## Images

### Briefing Chart Image

NASA Laser Communications with Adaptive Optics and Linear Mode Photon Counting, Phase I  
(<https://techport.nasa.gov/image/131281>)

## Project Management (cont.)

### Program Manager:

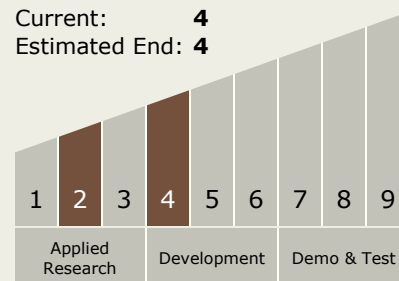
Carlos Torrez

### Principal Investigator:

Jim F Riker

## Technology Maturity (TRL)

Start: **2**  
Current: **4**  
Estimated End: **4**



## Technology Areas

### Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
  - TX05.1.5 Atmospheric Mitigation

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## Target Destinations

The Sun, Earth, The Moon,  
Mars, Others Inside the Solar  
System, Outside the Solar  
System